

NOTES ON THE BYTHITID FISH GENUS *SACCOGASTER* WITH A NEW SPECIES FROM THE GULF OF MEXICO

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ABSTRACT. A new bythitid fish species, *Saccogaster rhamphidognatha*, is named from the Gulf of Mexico. Diagnostic characters are a hook-like projection on the maxillary, seven branchiostegal rays, and 12 pectoral fin rays. A revised diagnosis for *Saccogaster* is presented, with a key to the eight species in the genus. The third known specimen of *S. staigeri* is recorded from the northwest Gulf of Mexico, a 1600-km range extension. Data are given for two Australian specimens, from New South Wales and Western Australia, which are tentatively identified as *S. tuberculata*.

INTRODUCTION

This paper reports on four specimens of the rarely encountered bythitid genus *Saccogaster*, which recently have come to hand. Two of these small ophidiiform fishes, caught in the Gulf of Mexico nearly two decades ago, were discovered in the Collection of Fishes of Texas A&M University and sent to me for study. Each represents a different species. One of them is the third known specimen of *S. staigeri*, and the other is undescribed and represents the eighth known species of *Saccogaster* and the second to be discovered since the genus was reviewed by Cohen and Nielsen (1972). Two other specimens, both recently caught, one off Sydney and the other off the northwest shelf of Australia, were sent to me from the Australian Museum and are tentatively identified as *S. tuberculata*, known also from the South China Sea and Hawaii. In this paper I rediagnose the genus based on additional material, present a new key to the eight species, describe one new species, and present new information about *S. staigeri* and *S. tuberculata*.

Terminology and methods follow Cohen and Nielsen (1972, 1978). Study material is housed in the Australian Museum, Sydney (AM), the Natural History Museum of Los Angeles County (LACM), and Texas A&M University (TCWC).

Saccogaster Alcock

DIAGNOSIS. Ophidiiform fishes of the family Bythitidae, subfamily Bythitinae as defined by Cohen and Nielsen (1978: 42). Scales absent from head, reduced or absent on body. Tail section of body not attenuate. Anal fin originating on

posterior half of body. Pectoral fin supported by elongate radials (enclosed in a free peduncle in some species, adnate in others). Maxillary vertically expanded posteriorly. Opercular spine present. Palatine teeth present. Developed rakers on first arch 0–6. Ventral fins with 1 ray in each. Pectoral fin rays 12–23. Branchiostegal rays 7, 8, or 9. Precaudal vertebrae 12–20. Males with a stalked intromittent organ.

KEY TO SPECIES OF *SACCOGASTER*

- 1a. Scales absent 4
- b. Scales present on body 2
- 2a. Spine on opercle with three points; pectoral fin rays 22; dorsal fin rays 92 *S. hawaii*
- b. Spine on opercle with a single point; pectoral fin rays 16–18; dorsal fin rays 75–88 3
- 3a. Gill filaments on first arch not notably reduced in size; palatine tooth row several teeth wide; dorsal fin rays 75–83 *S. maculata*
- b. Gill filaments on first arch notably reduced in size; palatine teeth in a single row; dorsal fin rays 87–88
..... *S. staigeri*
- 4a. An antrorse, hook-like projection at posteroventral angle of maxillary; pectoral fin rays 12; branchiostegal rays 7 *S. rhamphidognatha* new species
- b. No hook-like projection at posteroventral angle of maxillary; pectoral fin rays 14–23; branchiostegal rays 8 or 9 5
- 5a. Pectoral fin borne on a free, fleshy peduncle; gill opening extending above level of top pectoral ray 6
- b. Pectoral fin without a free, fleshy peduncle; gill opening restricted, not extending above level of top pectoral ray 7
- 6a. Pectoral fin rays 20–23; anal fin rays 56–61; developed rakers on first gill arch 3 *S. tuberculata*
- b. Pectoral fin rays 14; anal fin rays 64; developed rakers on first arch 6 *S. parva*

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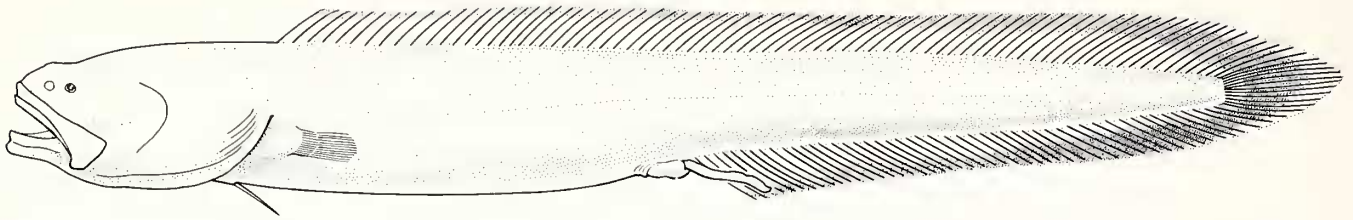


Figure 1. *Saccogaster rhamphidognatha* new species. Holotype, LACM 44189-1. Standard length 59.7 mm. Drawn by Sharon Belkin.

- 7a. Posterior end of maxillary sheathed dorsally; anal fin rays 53–54; nasal chambers not sooty black *S. normae*
 b. Posterior end of maxillary not sheathed; anal fin rays 37; nasal chambers sooty black *S. melanomycter*

Saccogaster rhamphidognatha new species

Figure 1

HOLOTYPE. The only known specimen, LACM 44189-1 (formerly TCWC 3915.4), ♂, Gulf of Mexico, off Mississippi delta, 29°13.5'N, 88°16.5'W, 210 m, RV ALAMINOS, stat. 69A13-43, Oct. 4–16, 1969.

DIAGNOSIS. An antrorse, hook-like projection at the posteroventral angle of the maxillary; branchiostegal rays 7; pectoral fin rays 12.

DESCRIPTION. Counts and measurements are presented in Table 1. Body slender, greatest depth about 8 in SL (standard length). Preanal about 1.8 in SL. Head compressed, about 4.7 in SL. Skin translucent to transparent. Scales absent.

Lateral line obsolete on body. Head pores apparently restricted to 1 in supraorbital series over upper lip medial to anterior nostril, 2 in the infraorbital series on the upper lip, and 2 in the mandibular series near the tip of the lower jaw.

Snout not notably fleshy or inflated. Posterior nostril large, about equal in diameter to clear window over eye; anterior nostril a small, simple pore above upper lip and lateral to supraorbital pore. Lower jaw slightly included. A short, strong, compressed non-emergent spine on the opercle. Upper rear part of maxillary free, not sheathed; a prominent antrorse hook present at the posteroventral angle.

Gill opening extending dorsally to above the level of the relatively narrow pectoral fin base, about even with the dorsal margin of the adnate skin-covered pectoral peduncle.

First gill arch with 2–3 flat spiny plates on the upper arm, a short spiny protuberance at the angle followed by 1 (right arch) or 2 (left arch) similar protuberances on the lower arch, followed by 6 spiny plates. Gill filaments on first arch short. Pseudobranch of 2 filaments present.

Dentition on premaxillary a narrow, exterior band of granular teeth and an inner band of larger, needle-like teeth. Vomer with a broadly U-shaped band of small, pointed teeth, which continues posteriorly onto the palatines. Dentary with a narrow exterior row of small, slightly compressed teeth and a single interior row of larger, pointed teeth.

Dorsal fin originating over centrum 7, anal fin under cen-

trum 24. Pectoral fin rays broken off short. Pectoral radials elongate but pectoral peduncle adnate. The pectoral fin base is narrow and does not occupy the entire distal margin of the peduncle. A single, short ray in each ventral fin, the rays immediately adjacent.

The type is an apparently mature male. The basal part of the intromittent organ is a fleshy, posteriorly directed protuberance, longer than wide, with the vent on the anteroventral surface; a prominent, 6-mm-long penis protrudes from the round, distal aperture.

Coloration pale on the head and body; vertical fins brownish distally.

Vertebrae 20 + 38 = 58; neural spines 5–8 variously depressed and truncate. First parapophyses on centrum 7.

RELATIONSHIPS. *Saccogaster rhamphidognatha* resembles four other *Saccogaster* species: *tuberculata*, *parva*, *normae*, and *melanomycter* (description of the first three in Cohen and Nielsen, 1972, of the last in Cohen, 1981) in a derived character, loss of scales, which is reductive and could have occurred independently in any combination of the five. The new species shares with two of these scaleless species, *S. normae* and *melanomycter*, two additional derived characters that are not reductive, an adnate pectoral fin peduncle and a restricted gill opening. Although all three of these species are well distinguished by autapomorphies, I interpret them as being more closely related to each other than to any other *Saccogaster* species.

ETYMOLOGY. The species name *rhamphidognatha* is coined from the Greek *rhamphidos*, a hook, and *gnathos*, the jaw.

Saccogaster staigeri Cohen and Nielsen, 1972

STUDY MATERIAL. TCWC 6146.1, ♀, northwest Gulf of Mexico, 27°44.9'N, 95°20.1'W, 338–384 m, RV ALAMINOS, stat. 68A13-19, 2-m dredge, Nov. 19, 1968.

This specimen is the third known, and the first taken since the species was described. Counts and measurements are presented in Table 1 and agree well with the type material.

Body scales are sparse and non-imbricate and thus resemble the pattern found in the female paratype rather than in the male holotype. The lateral canal has 1 pore, above the upper angle of the gill opening; supraorbital pore 1, above the upper lip and medial to the tubular anterior nostril; infraorbital pores 2, along the upper lip posterior to the anterior nostril. There are 7, larger teeth at the tip of the premaxillary, another character in which this specimen is more similar to

Table 1. Measurements and counts on *Saccogaster rhamphidognatha*, *S. staigeri*, and *S. tuberculata*.

	<i>S. rhamphidognatha</i>		<i>S. staigeri</i>		<i>S. tuberculata</i>			
	Holotype							
	LACM 44189-1		TCWC 6146.1		AM I 26002-005		AM I 22814-029	
	♂		♀		♀		♀	
	mm	% SL	mm	% SL	mm	% SL	mm*	% SL*
SL	59.7		65.2		84.5		160	
Snout to dorsal fin	14.1	23.6	19.6	30.1	25.6	30.3	48.0	30.0
Snout to anal fin	33.1	55.4	39.4	60.4	45.5	53.8	91.0	56.9
Snout to ventral fin	11.1	18.6	15.6	23.9	16.4	19.4	33.7	21.1
Body depth at vent	6.0	10.1	8.1	12.4	13.7	16.2	25.0	15.6
Head length	12.6	21.1	19.0	29.1	21.8	25.8	40.0	25.0
Snout length	2.8	4.7	4.1	6.3	4.7	5.6	8.0	5.0
Eye diameter	0.9	1.5	1.8	2.8	2.7	3.2	4.4	2.8
Interorbital width	2.4	4.0	3.9	6.0	5.0	5.9	8.8	5.5
Upper jaw length	6.0	10.1	9.3	14.3	10.9	12.9	19.4	12.1
Depth of maxilla	2.4	4.0	3.2	4.9	3.6	4.3	6.4	4.0
Cleithrum to ventral fin	1.3	2.2	2.7	4.1	2.0	2.4	7.0	4.4
Ventral fin length	3.7	6.2	7.5	11.5	8.7	10.3	17.6	11.0
Pectoral peduncle length	—	—	4.0	6.1	4.0	4.7	7.3	4.6
Pectoral fin base width	1.5	2.5	3.0	4.6	4.3	5.1	9.5	5.9
Pectoral fin length	—	—	9.4	14.4	11.8	14.0	21.1	13.2
Dorsal fin rays	77		88		89		85	
Anal fin rays	49		53		56		61	
Pectoral fin rays	12		18		22		23	
Caudal fin rays	12		13		12		12	
Branchiostegal rays	7		8		—		9	
Vertebrae	20 + 38 = 58		14 + 38 = 52		12 + 43 = 55		56	

* Specimen is bent at midlength; hence, longer measurements and proportions are imprecise.

the female paratype with 9 teeth rather than to the male holotype with 20. Whether this variation might be related to sex or size cannot yet be determined, as the holotype is 93.1 mm SL and the paratype 61.2 mm SL, similar to 65.2 mm SL for the present specimen.

DISTRIBUTION. The holotype was caught off the east coast of Florida, the paratype in the eastern Gulf of Mexico south of Tortugas Island off the tip of Florida. The present specimen is an extension of known range of about 1600 km to the northwestern Gulf of Mexico.

Saccogaster tuberculata (Chan, 1966)

STUDY MATERIAL. AM I 26002-005, ♀, New South Wales, 33°34'S, 152°02'E, 658 m, FRV KAPALA, stat. no. K 86-01-06, 11 Feb., 1986. AM 22814-029, ♀, Western Australia, 18°29'S, 116°36'E, 696–704 m, mud bottom, RV SOE-LA, 6 April, 1982.

This species has been known previously from four specimens, the holotype from the South China Sea, and three other examples from a single locality in the Hawaiian Islands (Co-

hen and Nielsen, 1972). The two specimens (measurements and counts presented in Table 1) here discussed (recorded from Australia by Paxton et al., in press) are tentatively identified as *S. tuberculata*. Although they agree with the species diagnosis and in most respects with the description given by Cohen and Nielsen (1972), there are some differences between the two Australian specimens and between Australian and other specimens. Some of these differences may be attributed to size as specimen AM I 26002-005 from New South Wales (NSW) is smaller than any others, and AM I 22814-029 from Western Australia (WA) is larger.

The skin in NSW is thin with a moderate degree of fine pigmentation giving the fish a light brownish cast; the skin over the venter is clear and the viscera are visible as there is neither peritoneal pigmentation nor musculature around this area. WA has thick pale skin as described for other specimens and a pigmented peritoneum that conceals the viscera.

The lateral line in NSW has only about a dozen papillae; in WA it is obsolete. There is a pore slightly posterior to the rear margin of the maxillary in WA; no such pore exists in

either NSW or in previous specimens. WA is apparently unique in having a prominent pore, about as large as the eye, on the rear margin of the preopercle.

There are nine branchiostegal rays in WA; an accurate count is not possible in NSW; there are eight branchiostegals in other specimens.

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